The Effect of Varying the Electrofishing Design on Four Large Rivers in the Ohio River Drainage Basin

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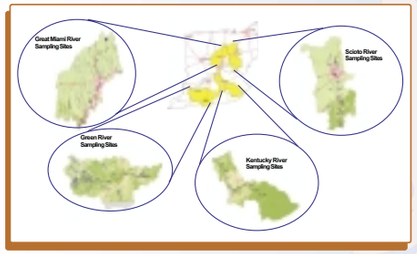
Final Objective of Project:

Provide states, regions, and tribes with guidance on the design of electrofishing studies on large rivers.

This Presentation:

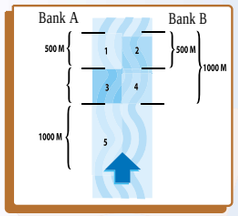
Effects that a single-bank vs. a paired-bank electrofishing design and varying the electrofishing distance have on number of species and species composition in four Ohio river Drainage Basins.

Study Area:



Method:

- 3000 m electrofished at each site
- Fish processed:
  - at least every 200 m on Bank A
  - every 500 m on Bank B



Analysis:

Distance

- 2000 m was maximum believed logstically reasonable

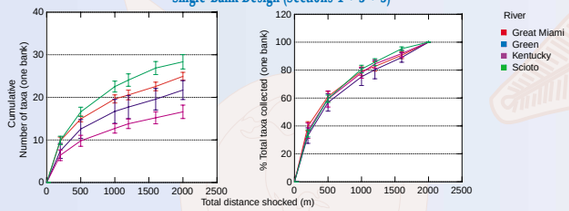
Fish

- Excluded exotic species
- 50 of 60 sites analyzed
- Number of species and species composition

Number of Fish Species vs. Distance Electrofished

Does the effect of distance electrofished on the number of species collected vary among rivers?

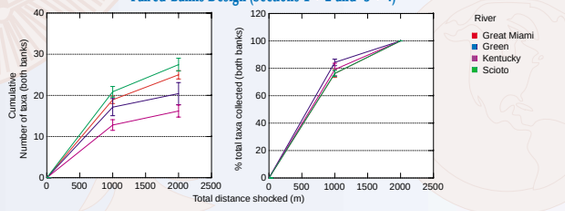
Single-Bank Design (Sections 1 + 3 + 5)



- Absolute numbers of fish species varied among the four rivers, but the increasing trend was similar among the rivers.
- The percentage captured at 1000m (of a total of 2000m) was consistent among rivers.

What is the effect of electrofishing design (single-bank vs. paired-banks) on this pattern?

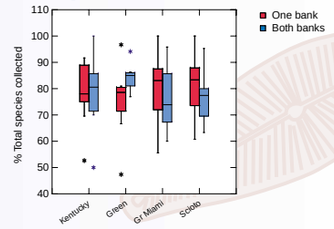
Paired-Banks Design (Sections 1 + 2 and 3 + 4)



- Patterns are similar for both designs.
- For both designs, an average of 75-80% of species were captured within the first half of the total distance electrofished.

What is the effect of electrofishing design on species collected in the first 1000m of a 2000m total distance?

Percent total species collected at 1000 vs. 2000 m



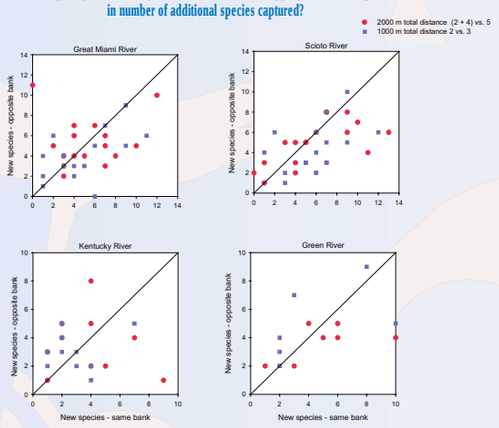
- Electrofishing design influences results but not consistently across rivers.
- We are now looking for relationships with physical habitat parameters which account for the patterns we see among and within rivers and sites.

Conclusions:

- The majority of fish species were captured in the first 1000m electrofished.
- Sampling design and river did not greatly affect patterns of number of fish species with distance electrofished.

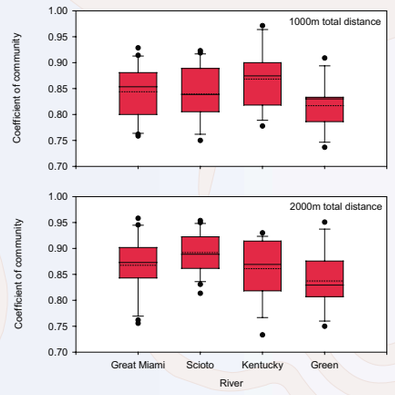
Single-bank vs. Paired-banks Designs

In comparing the two designs, how do the non-overlapping sections compare in number of additional species captured?



- In the Great Miami, Green, and Kentucky Rivers, there were no apparent consistent differences between the two designs at either scale.
- In the Scioto River, there was a slight bias towards a higher number of additional species using the single-bank design at both scales, with a significant bias at the 1000m scale (based on 95% confidence intervals of differences).

What is the effect of electrofishing design on species composition?



- Based on the relatively large values for the Coefficient of Community (CC), a similarity index, species collected using the two designs overlapped greatly.
- In the Scioto River, similarities were slightly, but significantly higher (paired t-test, t=3.397, p=0.004) at the 2000m scale than the 1000m scale. In the other rivers, scale did not affect the CC value.

Conclusions:

- Generally, electrofishing design did not lead to any consistent biases in the number of species captured, particularly when larger distances were sampled.
- Across the four rivers, approximately 75-95% of species overlapped between the single-bank and paired-banks designs, regardless of the total distance electrofished.

Future Direction Of This Research:

- Integrate physical habitat data into the analysis to see if it helps explain the observed findings.
- Study the effects of distance and design on common fish metrics.
- Study the spatial variability with respect to metrics.
- Compare the results of the elctrofishing data to benthic macroinvertebrate and algae data collected at the same sites. Is there agreement among different assemblages?

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